

Machine Learning

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Abstract— One of the most often heard criticisms of AI is that machines cannot be called intelligent until they are able to learn to do new things, new tasks, process new activities on their own and to adapt to new situations, rather than simply doing as they are told to do. Alan Turing proposed a question in the magazine once stating that, “Can Machines Think?”. In today's date large amount of data is available all around, hence it is very necessary to gather all the data and use it to solve the future problems and other problems that might come up.

Keywords: Machine Learning, Reasoning, Intelligent, Data Reasoning, Artificial Intelligence

I. INTRODUCTION

Machine Learning refers to the ability of a computer to learn new things automatically and to improve itself and its functioning by being influenced from the world outside without being programmed for the same. Machine Learning is said to be one of the applications of Artificial Intelligence. The learning process of a system begins with the observation of data, understanding the data and the condition in which the type of data is implemented by the system.

Machine Learning is one of the most effective and upcoming technology in today's world. Machine Learning is a very crucial part of AI (Artificial Intelligence) that allows a system to learn things on its own on the basis of the data present or provided to the system. It is a tool for turning information into knowledge. This simply means that some data that is provided to the system once will be stored in the system and it will be utilized by the system for the future. The system when put in conditions similar to the previous or past situations will process the data for the condition on its own. Most of us unaware that we interact with Machine Learning every single day. All the time when we Google something, play a song, watch a movie, search something or buy something online, all this involves Machine Learning. The reason behind the evolvment and interest towards Machine Learning is that it is a step away from all the previous rule based systems. Machine Learning uses data and answers to find the rules behind the problems. To learn the rules governing a phenomenon, machines have to go through a learning process, trying different rules and learning from how well they perform. Hence, why it's known as Machine Learning.

There are multiple forms of Machine Learning; supervised, unsupervised, semi-supervised and reinforcement learning.

Supervised Learning means to learn a function that maps an input to an output depending on example I/O pairs.

Unsupervised Learning is a type of learning where you don't have to supervise your model. Instead the model works on its own to discover the information. It deals with unlabelled data.

Semi-supervised Learning makes use of small amount of labeled data with large amount of unlabelled data.

Reinforcement Learning is focused on how software agents take actions in an environment to maximize a notion.

There are many process involved in Machine Learning as listed below.

Data Collection: Means Collecting the data from which the algorithm will learn.

Data Preparation: Format and engineer the data into the optimal format, extracting important features and performing dimension reduction.

Training: Training is called as the fitting stage, in which the Machine Learning algorithm will actually learns by showing it the data that has been collected and prepared.

Evaluation: Test the model to see how well it performs.

Tuning: Fine tune the model to maximize its performance.

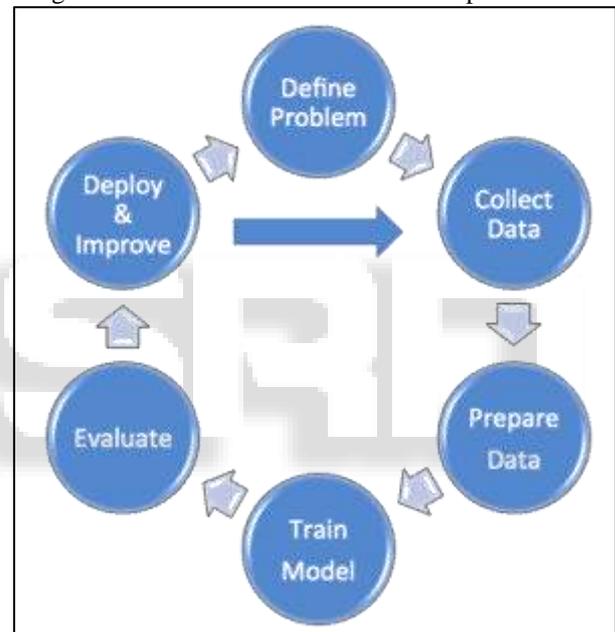


Fig. 1: Machine Learning Process

II. BACKGROUND

In 1950, Alan Turing came up with the world famous Turing Test. The test had a basic scope which asked only one question "Can Computers Think?" For passing this test the system had to convince the human that it is thinking like a human and not a computer.

In 1952, a computer program was built that could learn things on its own as it would run. This was a game that played checkers. It was developed by Arthur Samuel.

Also there was a racing car that won the championship and the car was computerized and programmed. This was also one of the examples of machine learning and Artificial Intelligence.

The students at the Stanford University designed a car which could navigate obstacles in a room by its own.



Fig. 2: Alan Turing

Most importantly, machine learning meant that a mathematical formula could be created for any condition or phenomenon. All this told only one thing that the machines had the potential to understand the humans and the world.

The term machine learning was coined by an American pioneer Arthur Samuel while he was at IBM.

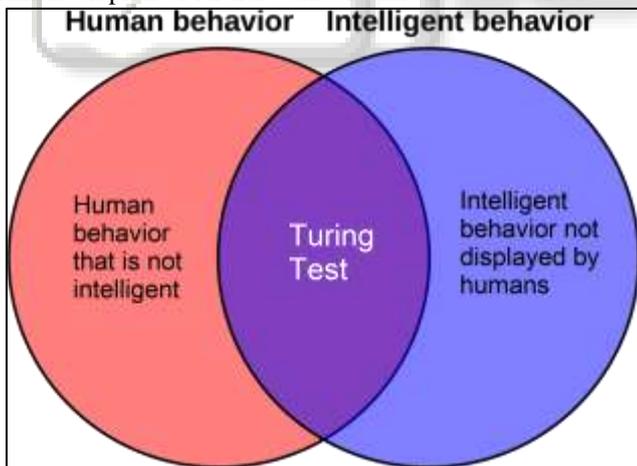


Fig. 3: Turing Test

Classification Algorithms in Machine Learning:

- Logistic Regression
- Decision Tree
- Random Forest
- Naive Bayes
- Support Vector Machines
- Nearest Neighbor
- Boosted Trees

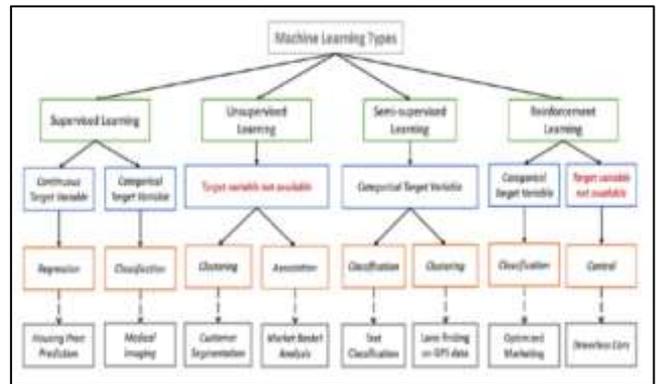


Fig. 4: Classification



Fig. 5: Arthur Samuel



Fig. 6: Game of Checkers

III. PROBLEM DEFINITION

The one of the feature of Machine Learning is the face detection problem. When the cameras of some of the mobile phones are used, the faces detected in the camera is not always human faces but the camera sometimes also detects the other objects that look similar to the human faces or living face. Also when the face detection feature is used in some mobile phones for security purposes there are instances when the unlocks by recognizing the wrong face.

This may lead to security threat and may cause massive loss of personal or some other data.



Fig.7. Partial Occlusions in images



Fig. 8: Incorrect face detection

IV. SOLUTIONS OF IDENTIFIED PROBLEMS AND ADVANTAGES

A. Solutions:

As there are many advantages of machine learning but one of the problems related to machine learning is Face Detection Problem. We can solve the following problems in the following way:

- While detecting the faces in camera the system is programmed such that it stores the data of the face and tries scanning the retina of the face so that it correctly detects the face.
- When face detection is related to security purposes, the system must be updated with a feature of remembering the retina of the eyes and scanning the retina of the persons eye so that no unauthorized user accesses the system or the device.

B. Advantages:

- The advantage of this is that the system will recognize the face correctly and appropriately.
- There will be no threat to the device in the case of security purposes.

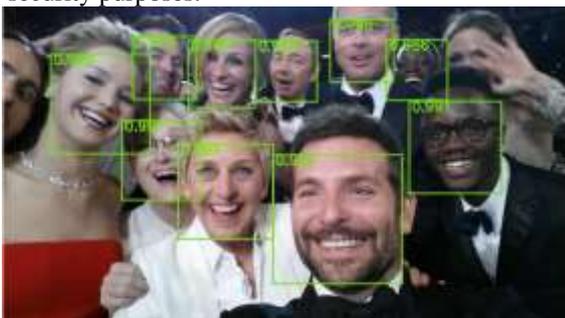


Fig. 9: Proper Face Detection

REFERENCES

- [1] <https://expertsystem.com/machine-learning>
- [2] https://en.wikipedia.org/wiki/Machine_learningNetwork_Security:_History,_Importance,_and_Future “University of Florida Department of Electrical and Computer Engineering Bhavya Daya”.
- [3] <https://www.geeksforgeeks.org/machine-learning/>